Affordable, Lightweight, Compactly Stowable, High Strength / Stiffness Lander Solar Array, Phase I Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)

ABSTRACT

Deployable Space Systems, Inc. (DSS) has developed a next-generation high performance solar array system specifically for NASA's future Lander and sample return missions. The proposed Lander solar array has game-changing performance metrics in terms of extremely high specific power, ultra-compact stowage volume, affordability, low risk, high environmental survivability/operability, high power and growth capability, high deployed strength and high strength during deployment (for mission environments that have high gravity and wind loading from atmospheres such as Mars), high deployed stiffness, high reliability, retraction and re-deployment capability, and broad modularity / adaptability to many missions. The proposed innovation is a tensioned membrane blanket solar array that stows very compactly with no auxiliary components extending beyond the stowed volume envelope of the stowed flexible blanket assembly, and when deployed becomes structurally pre-tensioned to create a deployed rigid body tensegrity-like configuration that exhibits very high deployed strength and stiffness. The proposed technology innovation significantly enhances Lander and sample return vehicle capabilities through its enabling performance and by providing a low cost alternative renewable power generating system in place of the very expensive standard RTG systems currently being used. The proposed innovation greatly increases performance and autonomy/mobility, decreases risk, and ultimately enables missions.

ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: NASA space applications are comprised of practically all Exploration, Space Science, Earth Science, Planetary Surface, and other missions that require affordable high-efficiency photovoltaic power production through of an ultra-lightweight, ultra-compact

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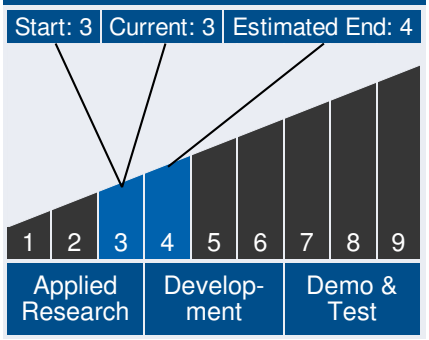
Technology Maturity



Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

Program Manager:

- Carlos Torrez

Continued on following page.

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stowage, high strength and stiffness, and highly-modular solar array system. The technology is particularly suited for Lander and sample return missions that require game-changing performance in terms of affordability, high power, compact stowed packaging, high deployed strength and stiffness, unsupported deployment in 1G, and lightweight. The technology is suitable for NASA LEO, MEO & GEO, and interplanetary missions.

To the commercial space industry:

Potential Non-NASA Commercial Applications: Non-NASA space applications are comprised of practically all missions that require affordable high-efficiency photovoltaic power production through deployment of an ultra-lightweight, ultra-compact stowage, high strength and stiffness, affordable, and highly-modular solar array system. Potential non-NASA commercial and DoD applications span a broad range of applications that demand ultra-compact stowage and very high strength and stiffness. The technology is suitable for non-NASA LEO, MEO & GEO missions. The technology is particularly suited for reconnaissance missions that require game-changing performance in terms of affordability, ultra-lightweight, compact stowage volume, and high deployed strength and stiffness.

Management Team *(cont.)*

Principal Investigator:

- Brian Spence

Technology Areas

Primary Technology Area:

Space Power and Energy Storage (TA 3)

└ Power Generation (TA 3.1)

└ Solar (TA 3.1.3)

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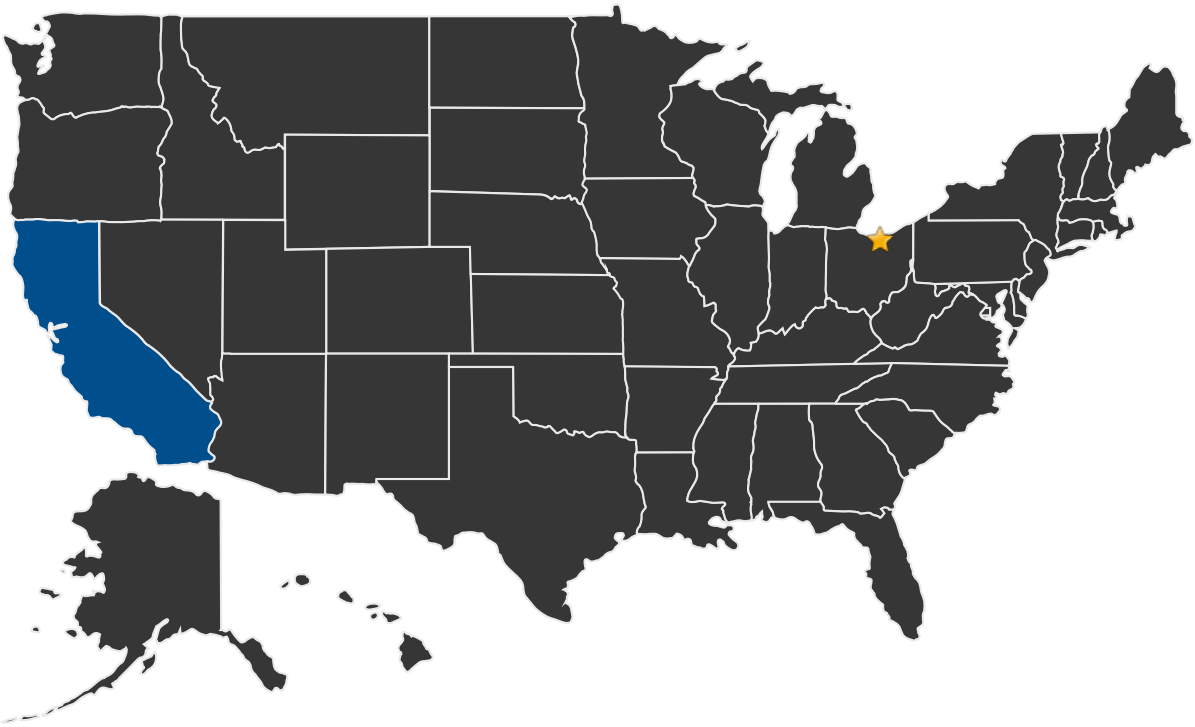
U.S. WORK LOCATIONS AND KEY PARTNERS



U.S. States With Work

Lead Center:
Glenn Research Center

Other Organizations Performing Work:

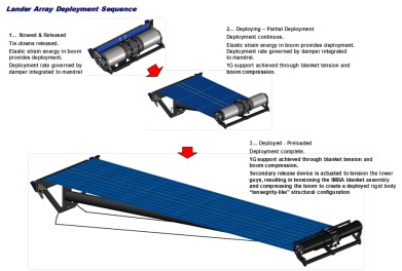
- Deployable Space Systems, Inc. (Goleta, CA)

PROJECT LIBRARY

Presentations

- Briefing Chart
  - (http://techport.nasa.gov:80/file/23498)

IMAGE GALLERY



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DETAILS FOR TECHNOLOGY 1

Technology Title

Affordable, Lightweight, Compactly Stowable, High Strength / Stiffness Lander Solar Array, Phase I

Potential Applications

NASA space applications are comprised of practically all Exploration, Space Science, Earth Science, Planetary Surface, and other missions that require affordable high-efficiency photovoltaic power production through of an ultra-lightweight, ultra-compact stowage, high strength and stiffness, and highly-modular solar array system. The technology is particularly suited for Lander and sample return missions that require game-changing performance in terms of affordability, high power, compact stowed packaging, high deployed strength and stiffness, unsupported deployment in 1G, and lightweight. The technology is suitable for NASA LEO, MEO & GEO, and interplanetary missions.